Boron Deficiency in Affected Areas of the State Readily Supplied by Simple Treatment
H. Earl Thomas and C. Emile Scott

It may seem odd at first blush that California, with its relatively high rainfall in large quantities, should have at least several thousand acres in which boron, the essential element for plant growth contained in borax and boric acid, is in short supply. There are certain areas in the state where boron in the soils and waters is present in sufficient quantity to cause considerable injury. This is rather to be expected since the amount needed for a particular crop and soil may be as low as 5 or 20 pounds per acre. On the other hand, the lower limit at which borax may be toxic can be as little as 0.3 pound per acre on a grape vine. Fortunately, the narrow margin between necessity and safety has not thus far been a serious problem in this state.

Pear and Olive Areas Most Affected
Boron deficiency has been seen and studied in many agricultural crops, many of them growing in or near the pear and olive areas.

The deficiency in California is more likely to be encountered in the upland areas than in the valleys. It is associated with both non-irrigated areas or those watered with relatively pure water. It may be related to poor drainage, heavy nitrogen fertilizer, and particularly by heavy timing.

The tree develops characteristic pits which are more numerous at the blossom end. At times some caution is needed in distinguishing these from those caused by insect stings.

The olive tree takes on a beautiful appearance at the ends of surviving branches. The tips of olive leaves turn light green, later bright yellow or orange.

Some affected pear fruits may crack but the most distinctive symptom is the pit. If a cut is made just beneath the skin at the base of the pit, there is seen a dark-brown core in the center surrounded by a light yellow circular area.

Preliminary Test is Simple
Diagnosis should not be considered final until a few trees or branches have been cured. A simple way to make preliminary tests is to bore holes into branches two feet or more above their bases and introduce about half a teaspoonful of borax or boric acid into each hole. The holes are then plugged with wooden discs or straws. If an improvement is seen, the next problem is to decide what method to use for the rest of the orchard.

For larger scale treatment, borax at one-half to two pounds per tree

Quick Deficit of Oranges
(Continued from page 1)

This work has involved field, green- house, and laboratory studies of many kinds to determine whether California farmers were operating with a virus or a bacteria. In the nutrition of citrus, there is little opportunity for nutritional deficiency or excess; to test it properly, one must measure the incompatibility between the sweet spot and certain strains of sour stock. Infections about the roots, which the grower undertakes to determine whether the defect is a nutritional deficiency or means excess might exist.

Diseased trees were inoculated to determine whether they could be saved by this means and also to show the possibilities of recovery.

An extensive series of rootstock trials has been started to learn more about the behavior of different viruses.

Experiments to learn whether some virus of intrinsic origin might develop were carried out.

Definite Final Decisions
All these factors are pointed to something other than nutrition as the basic cause of quick decline. One of the most noticeable signs that in declining trees, starch had largely disappeared from the smaller roots. No such starch disappearance was found on healthy trees outside the decline area.

The probable reason for starch disappearance has been established by the existence of a disease which appears to be metabolic in nature and is open to attack by organism.

Replacement Noticed
Not uncommon has been the case of trees showing disease symptoms has come the day of cure. The solution at present is to replace these trees with trees budded on sound stock.

Progress Reported in Search For Effective Control of Bovine Brucellosis
C. M. Harling

Results obtained by University of California veterinarian in cooperation with sixty-five dairy and beef cattle owners throughout this state over a period of several years, make it possible to establish degree of success in the control of bovine brucellosis (Bang's disease, or undulant fever) by cobalt and vitamin therapy to the slaughtered value of cattle.

By the use of freshly prepared and properly refrigerated Brucella abortus strain 19, the incidence of brucellosis may be held down to a point where it is not material for the slaughter of diseased cattle are un

Agricultural Outlook

Several garden plants such as broccoli, cabbage, cauliflower, celery, radish, lettuce and beets and rutabagas are known to be affected in small areas in this state. But the principal affected areas in California seem to be planted to tree fruits, notably olive and pear.

Tests conducted in 1941 and 1942 in Butte County demonstrated that several hundred acres of olives in that County might profit by additions of one or two pound applications of borax per tree. Increase in yield of olives doubled, which produces be- cause a similar olive growing area in Madera County was called to our at-

Boron is reduced, branches die back, much of the fruit drops prematurely—the olive early, and the pear late.

Aaffected fruit which remain on

the soil is the commonest method of treatment. Higher doses are occasionally required for cure but these should be used with great caution.

This is definitely not a situation where "if a little is good more is better." Soil treatments would supply the trees for about three years.

Spraying with borax, four pounds to 100 gallons of water, but after blossom time has the advantage of more rapid cure but the benefit is limited to one season only.

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The writers are indebted in this con- cern to County Agents Berry, Cass, Caine, Everett, and Lilliby and to Carl J. Hannon of the Agricultural Experiment Station.

A chemical taint of grasses consisting of sodium carbonate, sodium silicate, and glye has been found by the College of Agriculture's Divisions of Chemistry to be a weather resistant fire-extinguishing agent for grasses.

The above graph of reactors (diseased cattle) and abortions in a dairy herd during the past eleven years, illustrates the beneficial results to be expected from the use of BRUCELLA ABORTUS STRAIN 19, which is commonly infected with brucellosis. In 1935 the vaccine was used on all cattle regardless of age. During the following two years the incidence of these two diseases resulting from the vaccination of ten reactors and five abortions in 1946 is attributed to the purchase of some non-registered cows.

Cell vaccination against brucellosis is recommended for all dairy herds under present conditions in California, but adult cattle vaccination only to heards known to be badly infected.

Cell Vaccination Recommended
In certain beef herds the vaccination of yearling heifers each year for a period of several years has resulted in gradual increases in the calf crop. Brucellosis is still very prevalent in California dairy herds, however, in that is relatively rare in beef herds. For that reason University veterinarians recommend all dairymen to practice calf vaccination, but do not advise vaccination of any age or sex except those more than four months in calf. The injection of animals in advanced pregnancy may cause them to abort, therefore, in such cases vaccination should be postponed until after their calving.

Vaccination Program

In many cases, it is not necessary to vaccinate the heifer of any age be- cause when it reaches the age of six months should be continued over a period of years until blood tests show that the herd is free from Brucellosis. Even then, routine cell vaccination in dairy herds is recommended as an insurance against the possible increase resulting from the reproduction of the disease.

The work of the Agricultural Ex-

Vet-

Vaccinations against bovine reactions in cattle under the age of six years is approved, but for animals over six months of age, the vaccine used is Fresh and Potent. Cattle owners should make sure that the vaccine used on their ani-

mals is fresh and potent. Numerous tests have shown that the half commercial vaccine serials secured from drug stores or distributed by veterinarians in California were below government standards.

The labels on the vaccine bottles indicating that the vaccine was produced under government supervision, were no indication that the vaccine was of accept- able quality at the time of production. However, a later test of the same vaccine becomes impotent if not shipped and stored under proper conditions.

For that reason the California State Department of Health and Agricultural Cooperation are cooperating in tests on all vaccine used in the official state programs.

Veterinarians should be employed to select the animals suitable for vaccination and to administer the vaccine. These animals should be tested and tested for purity and viability at the laboratory of the State Department of Health.

Bovine Brucellosis

Benefactions to Vaccine
Vaccination can be injurious to undernourished or sick animals, but it prevents undulant fever and mild and hardy infection. Rea-

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